ROCKY FLATS PLANT,
WASTE TREATMENT FACILITY
(Rocky Flats Plant, Building 774)
Located adjacent to building 771C, in the northern portion of the protected area.
Golden Vicinity
Jefferson County
Colorado

HAER No. CO-83-AI

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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
Rocky Mountain System Support Office
National Park Service
P.O. Box 25287
Denver, Colorado 80225-0287

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HISTORIC AMERICAN ENGINEERING RECORD

ROCKY FLATS PLANT
WASTE TREATMENT FACILITY HAER No. CO-83-AI
(Rocky Flats Plant, Building 774)

Location: Rocky Flats Environmental Technology Site, Highway 93, Golden, Jefferson County, Colorado. Building 774 is located in the northern portion of the protected area. The west side of the building is adjacent to the east side of Building 771C.

Significance: This building is a secondary contributor to the Rocky Flats Plant historic district, associated with the United States strategy of nuclear military deterrence during the Cold War, a strategy considered of major importance in preventing Soviet nuclear attack. Constructed in 1953, Building 774 was the original liquid process waste water treatment facility at the Rocky Flats Plant (Plant). Building 774 was designed to treat the liquid process wastes generated in Building 771. As the Plant expanded to accommodate increased production of nuclear weapon triggers, Building 774 began processing wastes for additional Plant operations and buildings.

Description: Building 774 was originally a two-story rectangular structure designed to treat liquid process waste. The original portion of the building is constructed of poured-in-place concrete. By 1989, seven additions had been made to the building, resulting in a multi-level structure varying from one to four stories in height. The additions are constructed of block wall, reinforced concrete, metal-on-metal framing, and transite. As a result of the additions, floor space increased to 25,000 square feet. The facility is built on a steeply sloping site. The first floor on the north side is 7' 6" below-grade, and the fourth floor on the south side is 4' above-grade.

History: Building 774 was designed to treat the liquid process wastes generated in Building 771. As the Plant expanded to accommodate increased production of nuclear weapon triggers, Building 774 began processing radioactive acidic wastes; caustic, aqueous, and organic wastes; waste oils; and non-radioactive waste photographic solutions. Buildings 111, 112, 130, 371, T371J, 441, 444, 460, 551, 559, 664, 707, 750, 771, 776, 777, 881, and 991 generated one or more waste streams which were processed in Building 774. In 1971, the waste treatment operations in this building were enclosed to provide containment of radioactive airborne particles.

The goal of the waste treatment process which occurred in Building 774 was to reduce liquid radioactive wastes and convert them into a form suitable for transport off-site for storage and disposal. In general, wastes were either piped directly into Building 774, or transferred in drums, containers, or other types of packaging. The waste entered a series of interconnected tanks designed to treat acidic, caustic, and radioactive wastes and separate relatively low-level radioactive effluent from contaminated solids or sludges. Each of the four processes used in the building were tailored to meet certain characteristics of the waste. The waste may have passed through one or more of these processes before entry into the next stage of the operation. These first stage processes included:

- *Neutralization and filtration* of acidic wastes containing large quantities of metal ions or chloride ions. The main purpose of this process was to remove the large quantities of metal hydroxide solids from the waste stream, as these solids hampered the decontamination ability of the succeeding flocculation and clarification processes;
- *Batch neutralization, precipitation, and filtration* of acidic wastes containing only small quantities of metal ions or basic wastes containing large quantities of undissolved solids;
- *Continuous radioactive decontamination* of neutral and caustic wastes; and
- *Solidification* of aqueous wastes containing complexing agents, certain radioactive isotopes, or hazardous chemicals that were undesirable in the regular waste system. These wastes were mixed with an absorbent material and Portland cement in barrels for disposal. This process was eventually replaced by the organic and sludge immobilization system. The organic and sludge immobilization system accepted waste oils from any building at the Plant that contained transuranic material and converted the liquid waste into solid waste.

The second stage of the decontamination process included two separate radioactive waste decontamination processes. The benefit of segregating the wastes was better utilization of the waste storage ponds based on whether or not the wastes met standards for radioactive and/or chemical contamination. The two processes were:

- *Batch precipitation* to remove radioactive materials from wastes containing both radioactive and chemical contaminants in excess of standards. After the radioactive material was separated from the waste, if the remaining liquid met the on-site storage guidelines for radioactivity, it was transferred to asphalt-lined evaporation ponds, otherwise it was reprocessed to reduce contaminant levels; and
- *Continuous precipitation* to remove radioactive materials from wastes meeting the standards for chemical but not radioactive contaminants. After the radioactive material was separated from the waste, if the remaining liquid met drinking water standards, it was transferred to an evaporation pond, otherwise it was reprocessed to reduce contaminant levels.

The slurry from both processes was held in a slurry tank until it was processed by vacuum filtration to separate the solids from the liquid. The separated solids were mixed with a solidifying agent, and packaged for shipment and long term storage as transuranic-mixed (hazardous and radioactive) waste.

Recovery of silver from photographic solution also took place in Building 774. Waste photographic solution flowed through silver recovery units where silver was plated onto an electrically charged metal plate and recovered as silver ingots for resale.

The role of Building 774 diminished with the inauguration of the new process waste treatment facility in Building 374. Building 774 continued to process all contaminated organic wastes that could not be incinerated, and the liquid process wastes generated in Building 771.

Sources: United States Department of Energy. *Site Safety Analysis Report, Notebook 7-Security*, by EG&G Rocky Flats, Inc. Rocky Flats Repository. Golden, Colorado, 1994.

United States Department of Energy. *Mission Transition Program Management Plan, Site Support Facilities Element. Appendix A-1, A-2, A-3, A-5 Revision 7, A-4 Revision 4 (1992),* by EG&G. Rocky Flats Plant Repository, Golden, Colorado, 1992.

United States Department of Energy. *Draft Rocky Flats Plant Plutonium Recovery Reference Process,* by EG&G Rocky Flats, Inc., Golden, Colorado, 1991

United States Department of Energy. *Rocky Flats Plant, Interim Safety Analysis Report (1989),* by Rockwell International Energy Systems Group. Rocky Flats Repository. Golden, Colorado, 1989.

United States Department of Energy. *Final Cultural Resources Survey Report (1995),* by Science Applications International Corporation. Rocky Flats Repository. Golden, Colorado, 1995.

Weaver, Jack, employed at the Plant since 1961 by the site contractor. Personal communication, August 1997.

Historians: D. Jayne Aaron, Environmental Designer, engineering-environmental Management, Inc. (e^2M), 1997. Judith Berryman, Ph.D., Archaeologist, e^2M, 1997.